BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Biomedical Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 4: Investigative Project Skills**
Learning aim(s)	**C:** Safely undertake the project, collecting, interpreting and analysing the results **D:** Communicate and evaluate the findings of the project
Assignment title	**Project implementation and outcomes**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	In your role of research scientist working in manufacturing, research or services you will have completed a project plan and schedule for your chosen scientific investigation. You are now required to move to the implementation stage of the project. It is important for you to demonstrate good practical investigative skills. You will need to carry out a risk assessment for the practical work to be completed, identifying hazards and using relevant health and safety procedures. It is important during the implementation stage of a project that a logbook/diary is kept which documents all measurements or readings taken with accuracy, reliability and precision, and recording any approximations and anomalies. You also need to use the correct methodology to collect, record, analyse and present the data, which is crucial in obtaining an acceptable conclusion. You will need to present your project outcomes to a development team where the findings will be evaluated in terms of the success/effectiveness of the project and whether the original hypothesis has been met. The presentation should be sufficient to enable the team will decide if the project needs to be repeated with improvements to the methods/procedures chosen or if a totally new approach needs to be taken. A successful outcome can also be that although the hypothesis was not met, the development team of scientists/technicians have learnt from the project and have a clearer idea in which direction the development needs to proceed.

Task 1	You must safely undertake the project ensuring you:

- Demonstrate practical skills whilst being observed assembling apparatus/equipment effectively and efficiently, selecting the correct materials. Carry out the experiment safely. You should:
  - Assemble relevant equipment and materials.
  - Adhere to health and safety risk analysis, using PPE and controlling substances hazardous to health.
  - Skilfully transfer, handle and use equipment and materials.
  - Use equipment, instruments, sensors and techniques appropriately for taking measurements.
  - Use observation skills.
  - Adhere to relevant health and safety legislation, operating standards and good practice (local, national and international).

- Take measurements and readings accurately and reliably and record in a suitable format using a logbook/diary. Noting for example approximations and decimal point accuracy. Present your measurements in an appropriate format for example in a tabulated format and with headings and appropriate units. You should:
  - Record results with accuracy, integrity, precision.
  - Maintain working laboratory logbooks and record keeping.
  - Make qualitative observations and inferences.
  - Organise practical data in class intervals, tallying – tabulation data in a clear and logical format using correct headings with units where appropriate.
  - Identify of anomalous data and take appropriate action.
  - Recognise when it is appropriate to take repeats

- Process and present your data appropriately by rejecting anomalies taking means and calculating differences etc and select a suitable presentation format. Interpret the data to identify patterns and trends and draw a conclusion. You should:
  - Use a range of appropriate data presentation used (graph/chart/table).
  - Use correct units of experimental quantities used.
  - Explain choice of data presented.
  - Use a correct format to present chosen data

(plotting/labelling/scales).

- Identify trends/patterns in data.
- Compare primary and secondary data.
- Draw conclusions that are valid and relevant to the purpose of the investigation.
- Interpretation of statistical tests using tables of critical values and a 5% significance level, with reference to the null hypothesis.

- Apply and interpret your statistical analysis succinctly. Assess outcomes from statistical data and discuss the validity for your conclusions. Justify your choice of statistical analysis technique and why it was suitable in terms of accuracy, reliability and validity.

- Assess your choice of experimental techniques, data collection and presentation methods with regard to accuracy, reliability and validity. Comment on the suitability of your original hypothesis and justify your opinion using your collected primary and researched secondary data.

- Evaluate information collected from literature search and practical investigation work making judgements about accuracy, reliability and validity. Conclude if the hypothesis was valid and had been met or needed to be modified or rewritten. Discuss the strengths and weaknesses of the techniques and equipment used to include percentage of error analysis, and the experimental procedures and or use of alternative approaches. Evaluate the effectiveness of data collection, processing and results, comparing to any published information and discuss the limitations of your project.

Using the practical work undertaken you should produce a Scientific report for the investigative project, which uses correct scientific principles:

- Structure and format
- Use of correct scientific terminology
- Past tense, including third person
- Correctly written references and bibliography, including an appendix and correct use of the Harvard referencing system.

You will present the project report that have written to a group or project supervisor.

- Start by giving the background and hypothesis to your investigation, and then how you carried out the investigation, findings, analysis and conclusions.

	• You can decide what will be the most appropriate medium for your presentation, but it must be coherent and use appropriate scientific language.
Checklist of evidence required	A detailed report that includes: ● Evidence demonstrating your practical skills in assembling relevant equipment/apparatus and materials for your project ● Evidence demonstrating the use of safe working practices in carrying out the project ● Collection and recording of data accurately and reliably ● Processing and presentation of data in an appropriate format ● Interpretation of the results ● Application of statistical analysis to the data collected ● Assessment of the choice experimental techniques, data collection and presentation ● Assessment of outcomes from statistical analysis justifying you choice ● Evaluation of practical aspects and conclusions from the project ● A detailed representation of the project findings

	A presentation of the project findings, analysis and conclusions to be given to the 'development team' n.b. the development team will include your supervisor (assessor/tutor) as a the minimum.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
CD.D3	Evaluate practical aspects and conclusions from the project, including limitations, errors, improvements, and recommendations for further investigation.
D.M6	Present the project report findings, analysis and conclusions, communicating coherently and using scientific language.
C.M5	Assess outcomes from statistical data analysis and justify choice of technique in assuring accuracy, reliability and validity.
C.M4	Assess the choice of experimental techniques, data collection and presentation in terms of accuracy, reliability and validity of outcomes.
D.P8	Produce a report of the project findings with valid conclusions, using correct reporting protocols and scientific terminology.
C.P7	Apply statistical analysis to data collected.
C.P6	Process and present data in an appropriate format, with interpretation of the results.
C.P5	Collect and record data for the project accurately and reliably.
C.P4	Demonstrate practical skills to assemble relevant apparatus/equipment and materials, and carry out the project using safe working practices.
Sources of information to support you with this Assignment	All sources of information suggested are UK based. Centres are free to amend these sources these to those available in the Country of delivery where more appropriate. www.STEM.org.uk – 8 investigative projects, good practical science www.sciencebuddies.org – science projects, project guides, resources for finding and accessing scientific papers www.edu.rsc.org - all applying scientific method articles Within the copyright laws learners could search YouTube for 'The Scientific Method'
Notes to the Assessor and technician	The practical activities suggested for this assignment are required to be safety checked by the Centre before use. Pearson Education can take no responsibility for the safety of any practical activities.

	Before doing any practical activity, you should always carry out your own risk assessment and refer to the necessary regulations. In particular, any local rules issued by your employer must be obeyed, regardless of what is suggested here. Centres should use Health and Safety information provided by a reputable source. In the UK such an example organization is CLEAPSS http://science.cleapss.org.uk/